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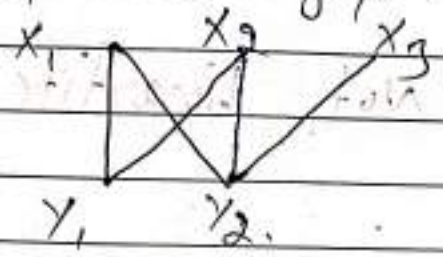
Assignment - 2.
[Part - A]

1) Define the bipartite graph?

=> A bipartite graph is a graph in which the vertices are devided into two disjoint set, such that no two vertices within the same set are adjacent. It is called bipartite graph?

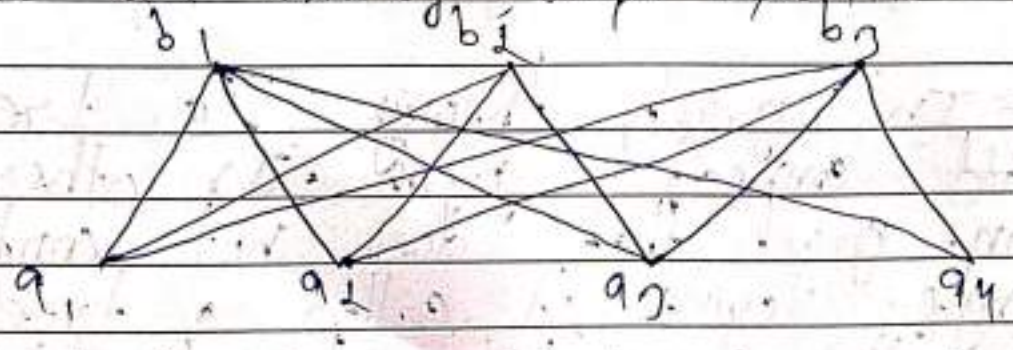


2) How many edges are there in a graph with 7 vertices each of degree 4?

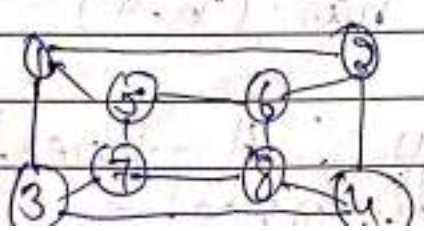
=> Total no. of edges = $\frac{(\text{No. of vertices}) \times (\text{Degree of each})}{2}$

$$\Rightarrow \frac{7 \times 4}{2} = 14.$$

3) Write an ex. of comp. bipartite graph?



4)



We can draw above graph in ano. way.

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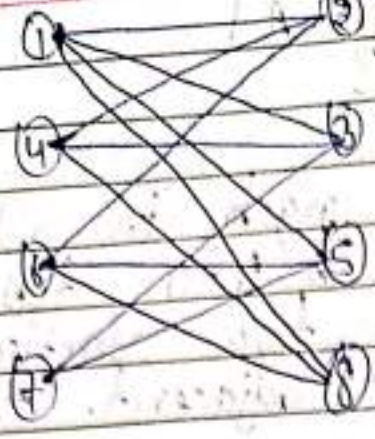
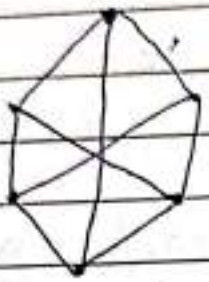
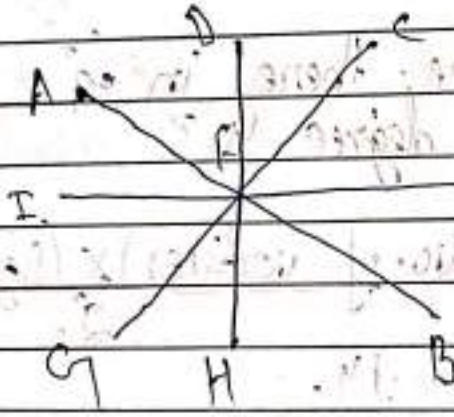


(b)  → Not bipartite graph.

(c) 

→ Bipartite graph.

(4) Define tree and forest?

Tree - In graph theory, a tree is undirected connected graph. In other words a conn. graph that does not contain even a single cycle is called a tree. A tree with n vertices has (n-1) edges.

Forest - In graph theory, A forest is an undirected, disconnected, acyclic graph.

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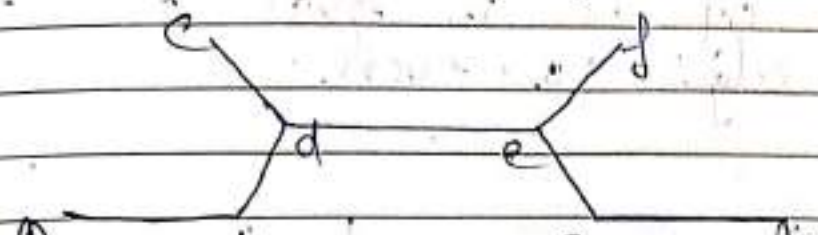
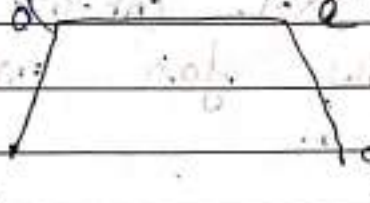
[5] Find the centre of the following tree?

⇒



Remove all vertices of tree & also remo. their edges, we get foll. tree.



Again remove all vertices of deg 1 and also remo. their edges we get

[Part-B]

[8] Which of the following are bipartite graph?

[2] prove that if $G = (V, E)$ is a graph with e no. of edges then $\sum_{v \in V} deg(v) = 2e$.

⇒ Proof :→ Since the degree of a vertex is the no. of edges incident with that vertex the sum of degree counts the total no. of times an edge is incident with a vertex. Since every edges is incident with exactly two vertices, each

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edge gets counted twice, once at each end. Thus the sum of the degree of the vertices of G is equal to twice the no. of edges or even.

[3] Prove that the comp. graph K_5 on five vertices is non-planner.?

⇒ The comp. graph K_5 contain 5 vertices and 10 edges Now for conn. planner graph :- $3v - e \geq 6$.

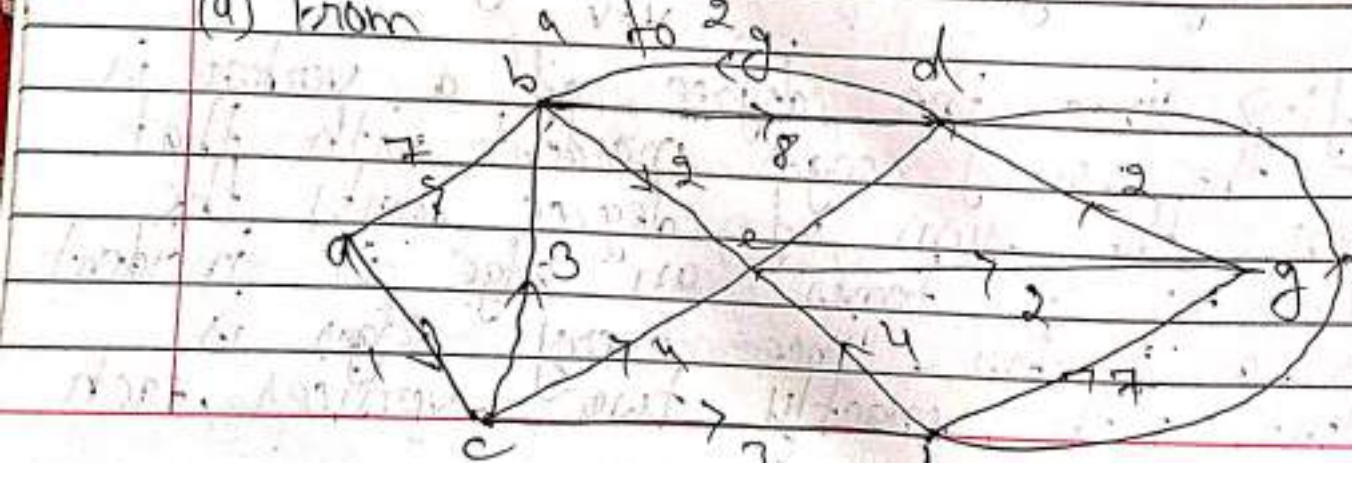
$3v - e \geq 6$ — v = vertices
$3(5) - 10 \geq 6$ — e = edges.

It does not satisfy the planner graph because it must be greater then or equal to 6. Thus K_5 is a non-planner graph.

[Part-C]

[4] Find the shortest path.

(a) From a to z.



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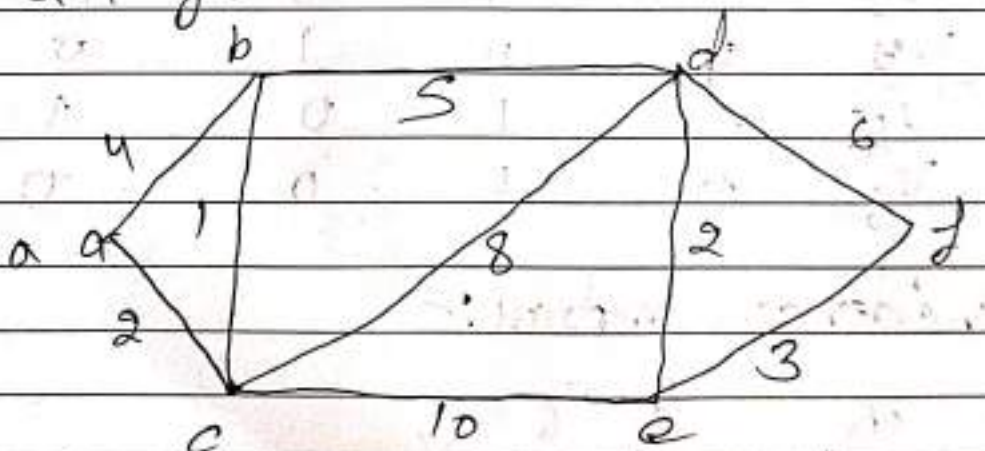
a	b	c	d	e	f	g
0	∞	∞	∞	∞	∞	∞
0	7	1	∞	∞	∞	∞
0	7	1	∞	∞	∞	∞
0	4	1	∞	5	4	∞
0	4	1	14	5	4	11
0	4	1	14	5	4	11
0	4	1	12	5	4	11
0	4	1	12	5	4	11
0	4	1	12	5	4	7
0	4	1	12	5	4	7.

shortest parth = aceg = 7.

(ii) from a to f.



a	b	c	d	e	f
0	∞	∞	∞	∞	∞
0	4	2	∞	∞	∞
0	3	2	10	12	∞
0	3	2	8	12	∞
0	3	2	8	10	14
0	3	2	8	10	13

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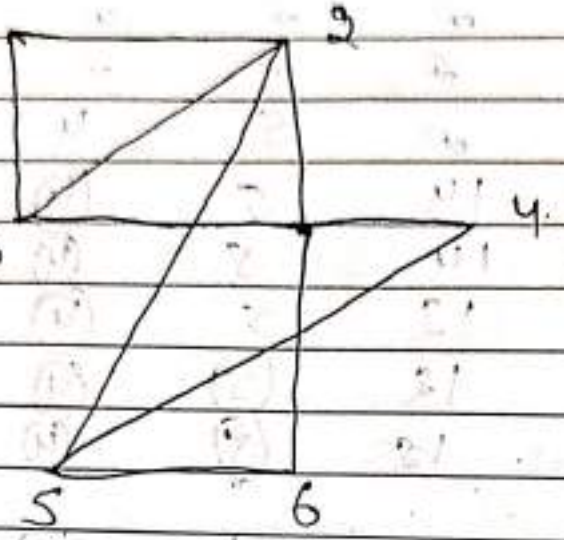
(2) Find the following

(a)

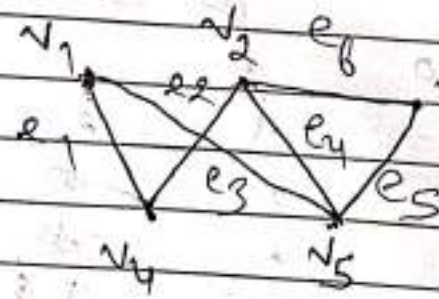


Adjacency matrix.

⇒

	V_1	V_2	V_3	V_4	V_5	V_6
V_1	0	1	1	0	0	0
V_2	1	0	1	0	1	1
V_3	1	1	0	1	0	0
V_4	0	0	1	0	1	0
V_5	0	1	0	1	0	1
V_6	0	1	0	0	1	0

(b) Incidence matrix:-



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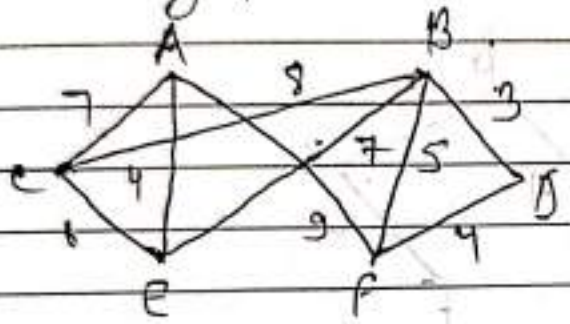
	e_1	e_2	e_3	e_4	e_5	e_6
V_1	1	1	0	0	0	0
V_2	0	0	1	1	0	1
V_3	0	0	0	0	1	1
V_4	1	0	1	0	0	0
V_5	0	1	0	1	1	0

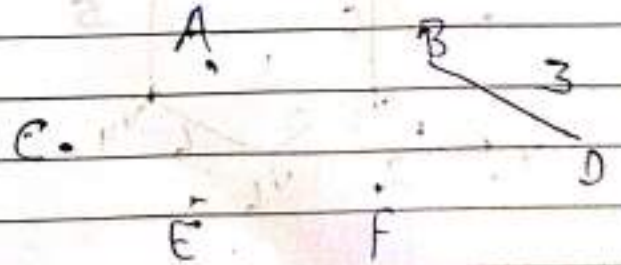
[3] Find the minimal spanning tree of the foll. graph.

(a)

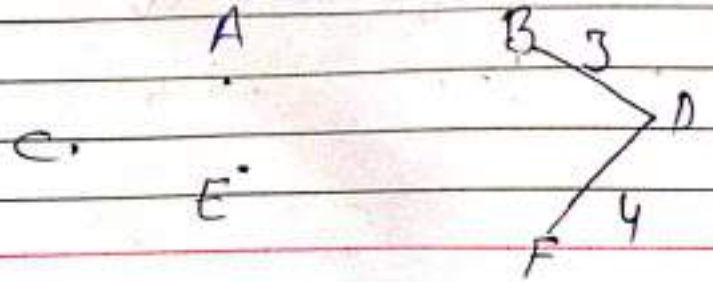


- Minimal spanning of the following graph using PRIM's algo.

Step 1 :-



Step 2 :-



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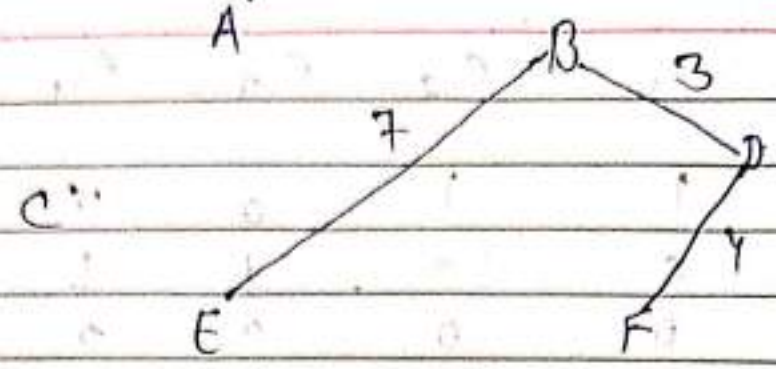
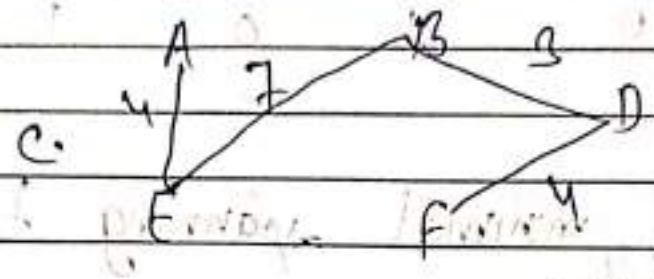
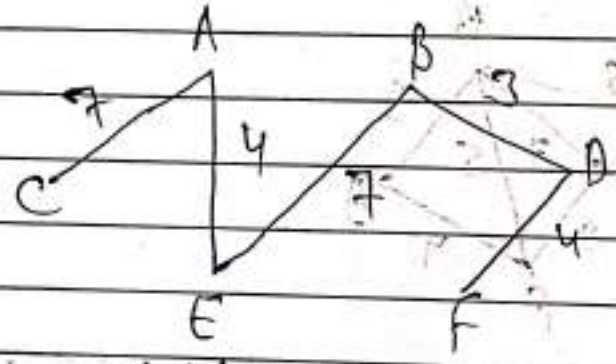
Step-3 :-



Step-4 :-

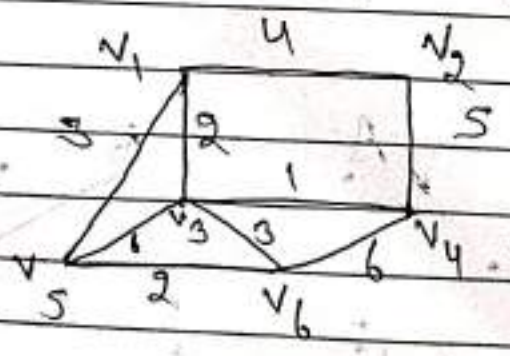


Step-5 :-

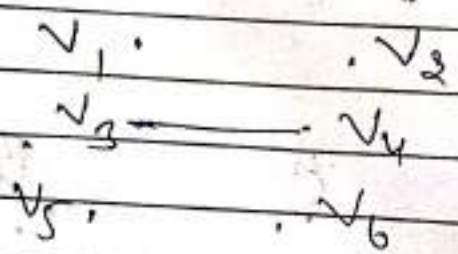


weight = 25

(b)



Step-1 :-



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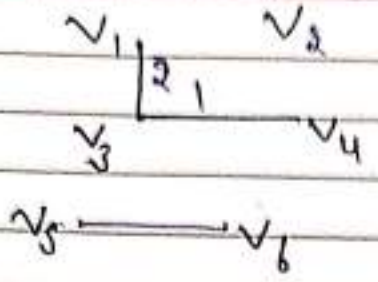
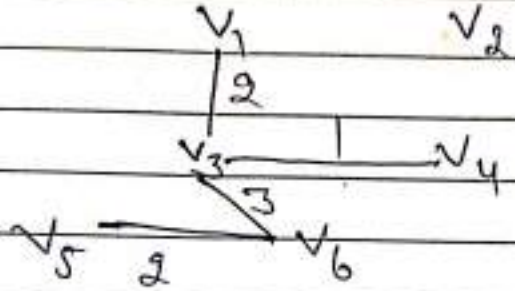
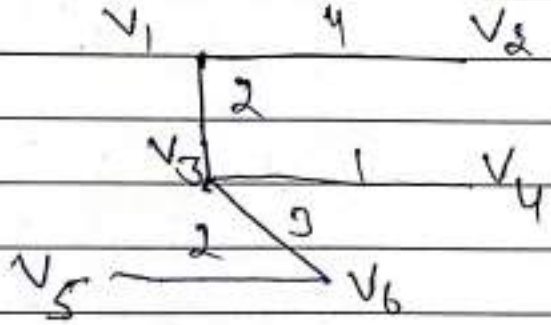
Step-2:-



Step-3:-



Step-4:-



weight = 12.